Topic 1: Amplitude, Period, Frequency, Range

State the amplitude, period, frequency and range of each function below.

1. \( y = \frac{1}{2} \cos \theta \)  
2. \( y = 3 \cos \theta \)  
3. \( y = \sin \frac{1}{2} \theta \)  
4. \( y = \cos \frac{2}{3} \theta \)  
5. \( y = 2 \sin 3x \)  
6. \( y = 13 \sin 4x \)  
7. \( y = \frac{3}{5} \cos \frac{1}{2} x \)  
8. \( y = 2 \sin (-1/4)x \)  
9. \( y = -3 \cos 2\theta \)

Write the equation for each of the following:
10. sine curve with amplitude of 5 and frequency of 2
11. cosine curve with amplitude of 1/3 and frequency of 3
12. sine curve with amplitude of 1 and period of 90
13. cosine curve with amplitude of 5 and period of 720
Topic 2: Graphing Sine and Cosine Curves

****ALL GRAPHS (including tables) MUST BE DONE ON GRAPH PAPER!!!!!******

1. Sketch the graph of \( y = 3\sin 2x \) from \( 0 \leq x \leq 360 \). Answer the questions below.
   a.) What is the period of the function?
   b.) What is the largest value of \( 3\sin 2x \)?
   c.) What is the range?
   d.) For what values of \( x \) in the interval \( 0 \leq x \leq 360 \) is \( 3\sin 2x = -3? \)
   e.) Between what values in the interval \( 0 \leq x \leq 360 \) is \( 3\sin 2x \) increasing? decreasing?

2. Sketch the graph of \( y = \frac{1}{2}\cos x \) from \( -180 \leq x \leq 180 \). Answer the questions below.
   a.) What is the period of the function?
   b.) What is the largest value of \( \frac{1}{2}\cos x \)?
   c.) What is the range?
   d.) For what values of \( x \) in the interval \( -180 \leq x \leq 180 \) is \( \frac{1}{2}\cos x = 0? \)
   e.) Between what values in the interval \( -180 \leq x \leq 180 \) is \( \frac{1}{2}\cos x \) increasing? decreasing?

3. Sketch the graph of \( y = 2\cos x \).

4. Sketch the graph of \( y = \sin 2x \).
6. Determine the equation of the graph:
   (A) $y = \cos 2x$
   (B) $y = 2\cos x$
   (C) $y = \frac{1}{2} \cos x$
   (D) $y = \cos \frac{1}{2} x$

7. Determine the equation of the graph:
   (A) $y = 2\sin \frac{1}{2} x$
   (B) $y = 2\sin 2x$
   (C) $y = 2\cos \frac{1}{2} x$
   (D) $y = 2\cos 2x$

8. Determine the equation of the graph:
   (A) $y = -\cos 2x$
   (B) $y = -\cos \frac{1}{2} x$
   (C) $y = -\sin 2x$
   (D) $y = -2\cos \frac{1}{2} x$
Topic 3: Systems of Trig Graphs

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1. A) On the same set of axes, sketch the graphs of the equations \( y = 2\cos x \) and \( y = \sin \frac{1}{2} x \) for all values of \( x \) on the interval \( 0 \leq x \leq 2\pi \)

   B) From the graphs drawn in part A, determine the number of values of \( x \) in the interval that satisfy the equation \( 2\cos x = \sin \frac{1}{2} x \)

2. A) On the same set of axes, sketch the graphs of the equations \( y = 2\cos 3x \) and \( y = \sin x \) for all values of \( x \) on the interval \(-180 \leq x \leq 180\)

   B) From the graphs drawn in part A, determine the number of values of \( x \) in the interval that satisfy the equation \( 2\cos 3x = \sin x \)

3. A) On the same set of axes, sketch the graphs of the equations \( y = 2\sin 2x \) and \( y = \sin \frac{1}{2} x \) for all values of \( x \) on the interval \( 0 \leq x \leq 360 \)

   B) From the graphs drawn in part A, determine the number of values of \( x \) in the interval that satisfy the equation \( 2\sin 2x = \sin \frac{1}{2} x \)

4. On the same set of axes graph \( y = \frac{1}{2} \cos 3x \) and \( y = 3\sin x \) on the interval \( 0 \leq x \leq 2\pi \).

   a.) For what values of \( x \) does \( \frac{1}{2} \cos 3x = 3\sin x \)?

   b.) For what values of \( x \) does \( \frac{1}{2} \cos 3x + 3\sin x = 3 \)?
Topic 4 and Topic 5: Graphing Tangent and Phase Shifts

****ALL GRAPHS (including tables) MUST BE DONE ON GRAPH PAPER!!!!!!*******

1. Graph \( y = 2\tan x \) in the interval \(-180 \leq x \leq 180\)

For each of the following below, consider the function \( y = \cos x \). State the shift (direction and number of units) of each.

2. \( y = \cos(x + 180) - 1 \)

3. \( y = \cos\left(x - \frac{\pi}{2}\right) + 2 \)